

Claims:

1. A cementing collar comprising:

first one-way flow valving for admitting fluid into the collar through an entry flow passage when the pressure of fluids external to the collar is greater than the pressure of fluids internal to the collar; and

second one-way flow valving for allowing fluid to flow from the collar through an exit flow passage when the pressure of fluid inside the collar is greater than the pressure of fluid outside the collar.

2. A cementing collar as defined in claim 1, wherein said first one-way valving is carried by a movable support that is movable between first and second positions within said collar whereby at said first position said first one-way valving prevents exit fluid flow from said collar through said entry flow passage and at said second position said support prevents exit fluid flow from said collar through said entry flow passage.

3. A cementing collar as defined in claim 1, wherein said first one-way valving comprises at least one flapper closure element.

4. A cementing collar as defined in claim 3, wherein said flapper closure element includes a semi-hemispheric surface adapted to engage and seal said entry flow passage to prevent exit fluid flow from said collar through said entry flow passage.

5. A cementing collar as defined in claim 3, wherein said flapper closure element includes a planar closure surface adapted to engage and seal said entry flow passage to prevent exit fluid flow from said collar through said entry flow passage.

6. A cementing collar as defined in claim 1, wherein said first one-way valving comprises an annular elastomeric seal carried internally of said collar adapted to engage and

seal against an internal tubular surface within said collar to prevent exit fluid flow from said collar through said entry flow passage.

7. A cementing collar as defined in claim 2, wherein said movable support is
5 movable axially within said collar between said first and said second positions.

8. A cementing collar as defined in claim 2, wherein said movable support is temporarily secured to said collar at said first position by a frangible retainer.

10 9. A cementing collar as defined in claim 2, wherein said movable support comprises a tubular body carried coaxially within said collar.

10. A cementing collar as defined in claim 1, wherein said entry fluid flow passage comprises at least one radial opening extending through said collar.

15 11. A cementing collar as defined in claim 9, further comprising axially spaced, annular elastomeric seals carried intermediate said tubular body and said collar.

12. A cementing collar as defined in claim 9, when said first one-way valving comprises at least one flapper closure element.

20 13. A cementing collar as defined in claim 9, wherein said first one-way valving comprises an annular elastomeric seal carried internally of said collar adapted to engage and seal against an internal tubular surface within said collar to prevent exit fluid flow from said collar through said entry flow passage.

25 14. A cementing collar as defined in claim 12, further comprising axially spaced, annular elastomeric seals carried intermediate said tubular body and said collar.

15. A cementing collar as defined in claim 13, further comprising axially spaced, annular elastomeric seals carried intermediate said tubular body and said collar.

16. A cementing collar as defined in claim 14, wherein said entry fluid flow passage comprises at least one radial opening extending through said collar.

17. A cementing collar as defined in claim 15, wherein said entry of fluid flow passage comprises at least one radial opening extending through said collar.

18. A cementing collar as defined in claim 16, wherein said flapper closure element includes a semi-hemispheric surface adapted to engage and seal said entry flow passage to prevent exit fluid flow from said collar through said entry flow passage.

19. A cementing collar as defined in claim 18, wherein said movable support is movable axially within said collar between said first and said second positions.

20. A cementing collar as defined in claim 19, wherein said movable support is temporarily secured to said collar at said first position by a shear pin.

21. A cementing collar as defined in claim 20, wherein said collar is connected within a casing string adjacent a float valve.

22. A cementing collar as defined in claim 20, wherein said float valve comprises said second one-way flow valving.

23. A cementing collar as defined in claim 22, wherein said second one-way flow valving comprises a spring-loaded check valve biasing a valve closure member toward a position resisting exit fluid flow from said exit flow passage.

24. A cementing collar as defined in claim 17, wherein:

said movable support is temporarily secured to said collar at said first position by a frangible retainer; and

said second one-way flow valving comprises a spring-loaded check valve biasing a valve closure member toward a position resisting exit fluid flow from said exit flow passage.

25. A method of cementing a casing string in a wellbore, comprising:

lowering a casing string equipped at its lower end with a cementing collar into a wellbore containing drilling fluids;

flowing drilling fluids from said wellbore into said casing string through a first one-way valve in said cementing collar, said first one-way valve permitting fluid flow in a direction from said wellbore into said cementing collar through an entry flow passage extending through said cementing collar and preventing fluid flow through said entry flow passage in a direction from said cementing collar into said wellbore;

pumping drilling fluids from said casing string into said wellbore through an end of said casing while said entry flow passage is closed to fluid flow from said casing string to said wellbore; and

thereafter, flowing drilling fluids from said wellbore into said casing string through said entry flow passage.

26. A method of cementing a casing string in a wellbore as defined in claim 25, further comprising, changing the position of said first one-way valve to prevent fluid flow into said casing string through said entry flow passage.

27. A method of cementing a casing string in a wellbore as defined in claim 25, further comprising, pumping a cement slurry through said casing string and into said wellbore.

28. A method of cementing a casing string in a wellbore as defined in claim 27, further comprising, changing the position of said first one-way valve to prevent fluid flow into said casing string through said entry flow passage.

5 29. A method of cementing a casing string of a wellbore as defined in claim 26, further comprising, pumping a cement slurry through said casing string and into said wellbore after changing the position of said first one-way valve.

10 30. A method of cementing a casing string in a wellbore as defined in claim 25, further comprising, pumping a first cementing plug through said casing string into engagement with said first one-way valve to change the position of said first one-way valve.

31. A method of cementing a casing string of a wellbore as defined in claim 30, further comprising, pumping a cement slurry through said casing string and into said wellbore after changing the position of said first one-way valve.

15 32. A method of cementing a casing string in a wellbore as defined in claim 31, further comprising, pumping a second cementing plug through said casing string behind said cement slurry for displacing said cement slurry from said casing string.

20 33. A method of cementing a casing string in a wellbore as defined in claim 26, further comprising, changing the position of said first one-way valve by shifting said first one-way valve axially through said cementing collar.

25 34. A self-fill cementing collar, comprising:
a tubular collar body having a fill port extending through a wall of said body;
a tubular valve sleeve carried coaxially internally of said collar body, said tubular valve sleeve being movable axially between first and second axially spaced positions within said tubular collar body;

a flow passage extending through a wall of said valve sleeve for fluid communication with said fill port in said collar body when said tubular valve sleeve is at said first position;

a check valve carried by said valve sleeve for admitting or preventing flow of fluid between said fill port and said flow passage when said tubular valve sleeve is at said first position; and

a temporary retainer for securing said tubular valve sleeve at said first position.

35. A self-fill cementing collar as defined in claim 34, further comprising, a seal closure connected with said tubular valve sleeve for closing the fluid communication between said flow passage and said fill port when said tubular valve sleeve is at said second position.

36. A self-fill cementing collar as defined in claim 34, wherein said check valve comprises a flapper valve.

37. A self-fill cementing collar as defined in claim 36, wherein said temporary retainer comprises a frangible member securing said tubular valve sleeve to said tubular collar body.

38. A self-fill cementing collar as defined in claim 37, wherein said flapper valve comprises a hemispherical closure section adapted to seat in a cylindrical bore extending radially through a cylindrical wall.

39. A self-fill cementing collar as defined in claim 37, wherein said flapper valve comprises a planar closure section adapted to seat on a planar axial end of a cylindrical wall opening.